**20CB101/20CE101/20CS101/20DS10120EC101/20EE101/20EI101/20IT101/20ME101**

**Hall Ticket Number:**

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| **I/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **July, 2021** | **Common to all branches** | | |
| **First Semester** | **Linear Algebra and ODE** | | |
| **Time:** Three Hours | | **Maximum:** 70 Marks | |
| ***Answer question 1 compulsory.*** | | | **(14X1 = 14Marks)** |
| ***Answer one question from each unit.*** | | | **(4X14=56 Marks)** |

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|  |  |  | CO | BL | M |
| 1 | a) | Define minor of a matrix. | CO1 | L1 | 1M |
|  | b) | The maximum value of the Rank of a 4X5 matrix is………………… | CO1 | L1 | 1M |
|  | c) | If A = then find the sum and product of the eigen values of A. | CO1 | L1 | 1M |
|  | d) | Write Cayley – Hamilton theorem. | CO1 | L1 | 1M |
|  | e) | Write the differential equation corresponding to Newton’s law of cooling. | CO2 | L1 | 1M |
|  | f) | Find the integrating factor of ( ) = ( . | CO2 | L1 | 1M |
|  | g) | Find the particular integral of | CO2 | L1 | 1M |
|  | h) | Write the Wronskian value of | CO3 | L1 | 1M |
|  | i) | Write the differential equation of L-R-C circuit with an emf E=E0 Sin(wt). | CO3 | L1 | 1M |
|  | j) | Find the general solution of | CO4 | L1 | 1M |
|  | k) | Find the value of L [ 3t ]. | CO4 | L1 | 1M |
|  | l) | State first shifting property for Laplace transforms. | CO4 | L1 | 1M |
|  | m) | Find the value of . | CO4 | L2 | 1M |
|  | n) | Write Convolution theorem for Laplace transforms. | CO4 | L1 | 1M |
| **Unit-I** | | | | | |
| 2 | a) | Use Gauss-Jordan method to find the inverse of the matrix | CO1 | L2 | 7M |
|  | b) | For What value of ‘k’ the equations x + y + z = 1, 2x + y + 4z = k , 4x + y + 10z = k2 have a solution and solve completely in each case. | CO1 | L2 | 7M |
|  |  | **(OR)** |  |  |  |
| 3 | a) | Find the Eigen values and Eigen vectors of the matrix | CO1 | L3 | 7M |
|  | b) | Verify Cayley – Hamilton theorem for the matrix and find its inverse. | CO1 | L2 | 7M |
| **Unit-II** | | | | | |
| 4 | a) | Solve ( 1 + y2 ) dx + (x - ) dy = 0. | CO2 | L3 | 7M |
|  | b) | If the air is maintained at 30oC and the temperature of the body cools from 80oC to 60oC in 12 minutes, find the temperature of the body after 24 minutes. | CO2 | L2 | 7M |
| **(OR)** | | | | | |
| 5 | a) | Solve y. | CO2 | L2 | 7M |
|  | b) | Solve 2xy**ꞌ** = 10x3y5 + y. | CO2 | L2 | 7M |
| **Unit-III** | | | | | |
| 6 | a) | Solve | CO3 | L2 | 7M |
|  | b) | Solve by the method of variation of parameters. | CO3 | L3 | 7M |
| **(OR)** | | | | | |
| 7 | a) | Solve | CO3 | L3 | 7M |
|  | b) | Solve | CO3 | L3 | 7M |
| **Unit-IV** | | | | | |
| 8 | a) | Find the Laplace transform of (i) (ii) | CO4 | L3 | 7M |
|  | b) | Find the inverse Laplace transform of . | CO4 | L3 | 7M |
| **(OR)** | | | | | |
| 9 | a) | Apply Convolution theorem to evaluate L-1 | CO4 | L3 | 7M |
|  | b) | Solve yꞌꞌ + 5yꞌ + 6y = 5e2t ,Given y(0)=0 and yꞌ(0)=0 using Laplace transforms.. | CO4 | L3 | 7M |

